(c) Remarks

The claims are 2, 8, 16 and 17. Claims 14 and 15 are cancelled without prejudice or disclaimer. Claim 2 is amended to better define the intended invention. New claims 16 and 17 are added. Reconsideration of the claims is requested.

Claim 2 is amended to recite compounds 1002 and 1007 disclosed in Chemical Formula 19, Exemplary Compounds 1002 and 1007, page 29, lines 10 and 15, respectively. Compound 1002 is synthesized in Production Example 2 on page 46 and Compound 1007 is synthesized in Example 2. Compound 1007 is employed in the devices of Examples 9, 10 and 11.

New claim 16 is directed to compound 1078 as synthesized in Example 4, pages 52-53. Compound 1078 is also disclosed as preferred in Chemical Formula 19 on page 29, last line.

Prior to addressing the grounds of rejection applicants wish to briefly review certain key features and advantages of the present claimed invention. The present invention provides a luminescent device comprising a luminescent layer containing a copper coordination compound including Compounds 1002, 1007 and 1078 as a guest material. The copper coordination compounds have as the central metal a copper ion of plus one-valence (monovalent ion). It has been discovered by applicants that, in organic EL (electroluminescent) devices, the presence of electrodes may cause problems for a copper coordination compound having a monovalent copper ion. Specifically, when copper coordination compounds were brought into contact with an electrode, it was found that an electrochemical reaction occurred so that the valence of the copper ion, as the central metal, was changed from monovalent to divalent (Cu^{+2}). As a result, the copper coordination compound lost its property as a luminescent (light-emission) material. To meet this problem the inventors have now provided a luminescent device designed so as not to bring the luminescent layer having a copper coordination compound as the guest

material into contact with the electrodes. To separate the copper coordination compound from the electrodes the inventors employed a first organic compound layer and a second organic compound layer to sandwich the copper coordination compound and isolate it from contact with the electrodes. This problem and its solution are not taught in the art, particularly in Yam.

Applicants utilize a copper coordination compound as a guest material, which, for examples, is described in Examples 9, 10 and 11.

Examples 9, 10 and 11, using Exemplary compound 1007, form luminescent layers each having a thickness of 40 nm and 20 nm and use different concentrations (% by weight) of copper coordination compound, (Ex. 9, 10: 10%; Ex. 11: 100%). As shown in Table 11, Examples 9, 10 and 11 achieve luminescence efficiencies of 6.8%, 11.0% and 8.2%, respectively. The organic EL device (Ex. 10) in which the copper coordination compound in the luminescent layer is in a concentration of 10% exhibited the higher luminescence efficiency.

Compound 1002 is a close analog of compound 1007 differing only in the group in the ortho position of the pyridine ring. Compound 1078 is the benzopyridine analog of compound 1007.

It is, therefore, demonstrated that organic EL devices using the instant copper coordination compounds as a guest material produce unexpectedly superior results.

It is not yet fully understood just why luminescence efficiency is improved by using the instant copper coordination compounds as a guest material. However, the inventors believe that when the luminescent layer is composed of only of the copper coordination compound, electrons and holes supplied are directly supplied to the copper coordination compound. Consequently, an ionization reaction such as anionization or cationization occurs in the copper coordination compound, so that the structure of the

copper coordination compound is broken and the copper changes from a luminescent monovalent compound to a non-luminescent divalent copper compound.

As noted above, the copper coordination compound is not luminous when the copper ion is divalent (Cu^{+2}).

In the luminescent device of the present invention, since the copper coordination compound having, as the central metal, a monovalent copper ion is present in a host material as a guest material, then electrons and holes can be prevented from being supplied directly to the monovalent copper coordination compound. The copper coordination compound of this invention is luminous because the copper remains monovalent (Cu^{+}).

With regard to the art rejection, Igarashi admittedly fails to teach a copper dimer complex as a light emitting material. Yam discloses compound 2 on page 2889. However, there is no disclosure or suggestion of a luminescent device having the copper compound sandwiched between organic compound layers to shield it from direct contact with the electrodes. There is no guest-host light-emitting layer. Yam does not even suggest the application of his compounds to organic EL devices.

Yam does not disclose electroluminescence devices, wherein electrodes are brought into contact with a sandwiched light-emitting layer containing the complex as a guest. Yam fails to teach the problem solved by the present invention.

Finally, Yam teaches that the emission properties of a sample, when it is contained in a liquid, are <u>inferior</u> to those in its bulk state. For comparison, in Table 1, the emission lifetimes are provided of a sample in a solid state, a sample in an n-hexane solution and a sample in a tetrahydrofran solution at the same temperature (298K). The sample in the solid state has an emission lifetime of 12 ($\tau_0/\mu s$). On the other hand, the samples in the n-hexane solution and tetrahydrofuran solution have shorter emission lifetimes of 6.8 ($\tau_0/\mu s$) and 6.0 ($\tau_0/\mu s$), respectively. It is taught thereby that Complex 2 in

the solid state (in the bulk state wherein it is not in some medium) exhibits superior lifetimes. Complex 2 in the liquid state, wherein it is dispersed or dissolved in some medium, exhibits inferior lifetimes. Amended claim 2 recites that the copper coordination compound is used as a guest material and is present in a host material (which is a medium for the guest). Therefore, if at all, unsatisfactory lifetimes when present as a guest, would be suggested by Yam.

It would not be obvious to try the Yam compounds in the claimed devices in the face of teaching which militates against using the compound as a guest.

The claims should be allowed and the case passed to issue.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our address given below.

Respectfully submitted,

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